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Memorandum

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To Neil Holsteen
EG&G

From Chuan-Mian Zhang
Pat Westphal

[Signature]

Office WCFS-Denver

Date November 30, 1994

Subject Surface Water Modeling Strategies for Supporting Risk Assessment
Rocky Flats, Operable Unit No 6, RFI/RI Report

This memo summarizes the OU-6 surface water modeling strategies for supporting risk assessment. These strategies were discussed in November among EG&G and WC staff. They will be implemented in the surface water modeling for predicting the long-term average concentrations of chemicals of concern (COCs) in pond sediment, pond water, stream water, and stream sediment at Indiana Street.

I Migration of metal and radionuclide COCs associated with soil erosion and sediment transport will be simulated. Semi-volatile (SVOC) and volatile (VOC) COCs in sediment and surface water will not be simulated for the following reasons:

- Potential for resuspension of pond sediment is expected to be very small, even under extreme flow conditions, according to our preliminary evaluations discussed in the memorandum dated October 7, 1994. Therefore it is not necessary to simulate the migration of pond sediment associated SVOC COCs from the ponds to Indiana Street. This preliminary evaluation will be documented in the Draft RI report for OU6.
- VOC COCs detected in the one sampling event conducted in pond and stream surface water will be used to evaluate risk associated with on-site exposures to surface water but will not be modeled for future concentrations at Indiana Street. Furthermore the maximum concentrations of each VOC are lower than Preliminary Risk-Based Remediation Goals for residential swimming water (DOE 1994), thus, it does not seem necessary to simulate such low concentrations. Historic data for surface water VOC concentrations will be compared to results of the one-time sampling event.

II Source concentrations of radionuclides and metals in surface soil to be used in the model for each subbasin will be estimated as follows:

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- Within each OU-6 IHSS, the arithmetic mean of measured concentrations will be calculated, non-detects will be replaced by half of the reporting limit
- For non-IHSS areas that were not sampled, concentrations of COCs are assumed to be zero, this permits estimating the impacts of OU6 sources on surface water/sediment
- Area weighted average concentrations for each subbasin will be calculated and used in the model as constant source concentrations for future prediction

III Among the four metal COCs in surface soil (antimony, silver, vanadium, and zinc), only antimony will be simulated, because

- Antimony is the worst-case metal based on comparison of 95% UCL concentrations in area of concern (AOC) 1 and 2 to risk-based concentrations for residential soil and evaluation of distribution of elevated concentrations in surface soil that could affect mass loading to the streams
- The contribution of metals to overall risk will be relatively minor compared to that from radionuclides. Therefore, a single "worst-case" metal can be used to demonstrate negligible impacts on surface water and sediment from metals COCs in surface soil
- For each HSPF simulation, only three chemicals can be simulated, simulating only one metal (along with plutonium and americium) can save about half of the simulation time

IV One reasonable maximum 30-year simulation of flow, soil erosion and contaminant transport will be conducted to predict the future long-term average concentrations of COCs

This one 30-year meteorologic data set will be selected as follows

- Generate 30 30-year meteorologic data sets using the climate generator in WEPP (USDA 1994),
- Calculate the average event precipitation amount during each 30-year period,
- Calculate the 95% UCL 30-year average event precipitation amount,

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- Select one 30-year meteorologic data set with an average event precipitation amount close to the 95% UCL value

The results are presumed to represent reasonable maximum future concentrations, based on the assumptions that

- Event precipitation amount is the most sensitive parameter in the soil erosion model (conversation with Dr Arlin Nicks, USDA, November 1994)
- The 30-year meteorologic data used in simulations is selected to approach the 95% UCL 30-year average event precipitation amount

V Results to be presented to risk assessment will be the average concentrations of plutonium, americium, and antimony during the reasonable maximum 30-year period in

- accumulated pond sediment in each pond,
- pond water in each pond,
- stream water in Walnut Creek at Indiana Street,
- stream sediment in Walnut Creek at Indiana Street

Reference

DOE 1994 Programmatic Risk-Based Preliminary Remediation Goals, USDOE, Rocky Flats Plant, Golden, Colorado, Final Revision 1, October 1994

USDA 1994 Water Erosion Prediction Project, USDA - Agricultural Research Service, National Soil Erosion Research Laboratory, West Lafayette, Indiana, USA

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